



## Arlington-Pascal Project

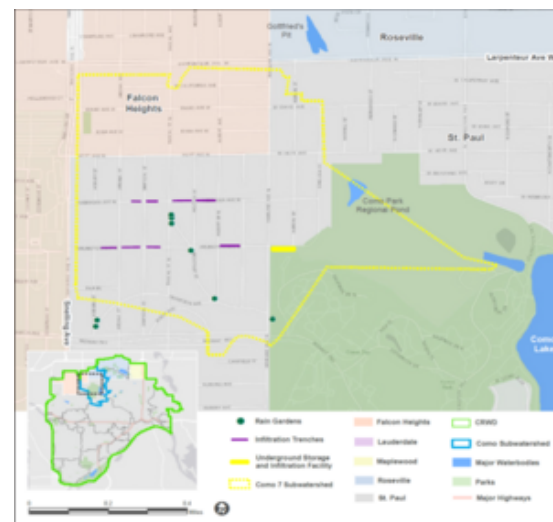


**Green Infrastructure:** Throughout this manual, these green alert boxes identify practices and concepts related to green infrastructure.

Prior to the implementation of the Arlington-Pascal Project, an area west of Como Lake known as the Como 7 subwatershed (see right photo), experienced frequent flooding and contributed to the pollution of Como Lake. Como Lake was listed as an **impaired water** ([https://stormwater.pca.state.mn.us/index.php?title=Special\\_Waters\\_and\\_Impaired\\_Waters](https://stormwater.pca.state.mn.us/index.php?title=Special_Waters_and_Impaired_Waters)) by the Minnesota Pollution Control Agency (MPCA) in the 2002 303(d) list. The impaired use is aquatic recreation, with the stressor identified as “nutrient/eutrophication biological indicators.”

Rather than build costly **gray infrastructure** to alleviate the flooding and reduce pollution, Capitol Region Watershed District (<https://www.capitolregionwd.org/>) (CRWD), the cities of Saint Paul, Falcon Heights, and Roseville, and Ramsey County worked together to construct eighteen stormwater features as part of planned street reconstruction. These stormwater **best management practices** (BMPs) include rain gardens (<https://stormwater.pca.state.mn.us/index.php?title=Bioretention>) (**bioretention practice**), **infiltration trenches** (<https://stormwater.pca.state.mn.us/index.php?title=Infiltration>), an underground stormwater storage and infiltration facility (the Arlington-Hamline Underground Stormwater Facility), and improvements to Como Park Regional Pond. The infiltration trenches and the Arlington-Hamline facility include **pretreatment** (<https://stormwater.pca.state.mn.us/index.php?title=Pretreatment>) to optimize their performance. Collectively, these features reduce stormwater by capturing and slowing down the stormwater to prevent flooding, filter the stormwater to prevent pollution, and beautify the neighborhood with **green infrastructure**. The Arlington-Pascal Project was the first large-scale capital improvement project (\$2.7 million) implemented by CRWD, including design, construction and bond interest costs for the project. Construction of the project BMPs began in 2005 and was completed in 2007.

CRWD staff complete monthly inspections of the rain gardens and contracted maintenance crews perform routine maintenance on a monthly schedule. Inspection items and tasks are listed in the table below.



Location of the Arlington-Pascal project, Capitol Region Watershed District (<https://www.capitolregionwd.org/>).



Routine Inspection or Maintenance Tasks <sup>1</sup>	
BMP and surrounding area free of trash and debris	BMP clear of dead plant material (including leaves)
BMP is free of accumulated sediment (if not, take measurement)	Quantity of sediment and organics removed (gallons)
Inlet(s) and pretreatment clean	Quantity of trash removed (gallons)
Outlet clear of trash and debris	BMP free of graffiti or other vandalism
BMP is weed free	
Additional Inspection or Maintenance Tasks <sup>1</sup>	
BMP is free of standing water (24 hours after rainfall)	Soil is stable and free of erosion
Mulch is evenly distributed and 2"-3" deep	Site is fully vegetated with healthy plants
<sup>1</sup> In the winter, inspections and maintenance are only done on an as-needed basis.	

Staff and crew use a mobile application to fill out an inspection form, record relevant information, and take photos. These data are automatically updated to a database where CRWD can evaluate them and the program, and keep track of maintenance expenses.

Extensive monitoring and modeling efforts have been conducted by CRWD since the project BMPs became operational. These efforts calculate and track the operation and performance of the individual BMPs and the project as a whole. Specifically, monitoring and modeling activities have aimed to determine BMP performance with regards to volume reduction ([https://stormwater.pca.state.mn.us/index.php?title=Volume\\_reduction\\_practices](https://stormwater.pca.state.mn.us/index.php?title=Volume_reduction_practices)), **total phosphorus (TP)** load removal, and **total suspended solids (TSS)** load removal. The inlets and outlets of the Arlington-Hamline Facility, Como Park Regional Pond, and two out of the eight infiltration trenches are monitored for water quality and/or flow while the rain gardens are monitored for peak water levels only.

**Year of completion:** 2007

**Location:** Como 7 subwatershed, West of Como Lake, Saint Paul MN

**Owner:** Capitol Region Watershed District, in partnership with the City of Saint Paul MN

**Designer:** Emmons and Olivier Resources (<https://www.eorinc.com/>)

**Building Type:** Public



### Design Features:

- One large underground stormwater storage and infiltration facility (the Arlington-Hamline Underground Stormwater Facility)
- One regional stormwater pond (Como Park Regional Pond)
- Eight rain gardens
- Eight underground infiltration trenches
- General storm drain improvements

### Pretreatment Features:

- Arlington-Hamline Facility: **Contech Vortech® Model 7000 hydrodynamic separator**
- Infiltration trenches: **sumped manholes and sumped catchbasins**

### Total Drainage Area:

- Arlington-Hamline Facility: 50 acres
- Como Park Regional Pond: 128 acres of direct drainage and 522 acres of indirect/managed drainage, for a total of 650 acres
- Infiltration trenches: 23 acres
- Rain gardens [bioretention]: 16 acres

**Total Construction Cost:** \$2.7 million, including design, construction and bond interest costs for the project

- Arlington-Hamline Facility: capital cost = \$800K; annual O&M cost = \$3.1K
- Como Park Regional Pond: capital cost = \$1.3M; annual O&M cost = \$6.5K
- Infiltration trenches: capital cost = \$400K; annual O&M cost = \$7.1K
- Normalized Construction Costs: \$14,300 per watershed acre; \$32,600 per impervious acre
- Normalized 35 year Projected O&M Costs: \$5,400 per watershed area; \$12,300 per impervious area

### Pollutant Cost-Benefit Analysis<sup>2</sup>:

- Volume reduction costs: \$0.03-0.06 per cubic foot of stormwater removed
- TSS reduction costs: \$0.34 - \$1.07 per pound of TSS removed
- TP reduction costs: \$395 - \$1,100 per pound of TP removed

<sup>2</sup>Pollutant cost-benefit analysis and removal estimates were based on data and modeling conducted in 2007-2010

### Documented Maintenance Practices:

- Arlington-Hamline Facility: routine inspections and trash removal from the pond's perimeter, inlet, and outlet
- Como Park Regional Pond: routine inspections and trash removal from the pond's perimeter, inlet, and outlet
- Infiltration trenches: routine inspections and debris and sediment removal from the pretreatment units, as well as manhole gasket replacement as needed
- Rain Gardens: routine monthly inspections and mowing, debris and trash removal, weeding, leaf removal, and thinning of plants

**Pollutant Removal Estimates<sup>2</sup>:**

- 155 pounds of phosphorus and 38,300 pounds of total suspended solids per year from the water quality practices
- 35 pounds of phosphorus and 32,000 pounds of particulate pollution per year from the Arlington-Hamline Underground Stormwater Storage Facility
- 90 pounds of phosphorus and 156,000 pounds of solid and particulate pollution per year from the Como Park Regional Pond
- 20% reduction annually in stormwater volume (1.9 million cubic feet) from the stormwater practices

**Access:** Publicly accessible

**Special Design Features:** At the time this project was conceived, these were some of the earliest large-scale green infrastructure practices installed in the Twin Cities Metropolitan Area that used a treatment train approach.

**Noteable Challenges:** The large-scale GI implementation was one of the first of its kind in the Twin Cities Metropolitan Area, and required careful planning and collaboration with many stakeholders.

**Other Benefits:** The numerous trees on site improve air quality, and reduce air temperature and urban heat island effect. The raingardens provide pollinator habitat and traffic calming.

**References and External Links:**

- Project overview (<https://www.capitolregionwd.org/projects/arlington-pascal-stormwater-improvement/>)
- Performance and cost-benefit analysis ([https://www.capitolregionwd.org/wp-content/uploads/2018/10/2007\\_2010\\_BM\\_P\\_Performance\\_March2012.pdf](https://www.capitolregionwd.org/wp-content/uploads/2018/10/2007_2010_BM_P_Performance_March2012.pdf))
- Brochure ([https://www.capitolregionwd.org/wp-content/uploads/2019/06/ArlingtonPascalBrochure\\_8-5x11.pdf](https://www.capitolregionwd.org/wp-content/uploads/2019/06/ArlingtonPascalBrochure_8-5x11.pdf))

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